

Montana Comprehensive Assessment System

Mathematics

Grade level learning expectations for Grades 3, 4, 5, 6, 7, 8, 10 and Upon Graduation

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10	Upon Graduation
Advanced	Advanced	Advanced	Advanced	Advanced	Advanced	Advanced	Advanced
a) demonstrates	a) demonstrates self-	a) demonstrates self-	a) demonstrates self-	a) demonstrates self-	a) demonstrates self-	a) demonstrates self-	a) demonstrates self-
emerging self-	motivation and	motivation and	motivation and	motivation and	motivation and	motivation,	motivation,
motivation and	emerging	increasing	increasing	independence as a	independence as a	independent as a	independent as a
independence as a	independence as a	independence as a	independence as a	learner;	learner;	learner, and extends	learner, and extends
learner;	learner;	learner;	learner;			and connects ideas;	and connects ideas;
b) accurately selects among several problem-solving strategies and uses them effectively;	b) accurately selects and uses problem solving strategies;	b) accurately selects and effectively uses appropriate problem- solving strategies	b) accurately selects and effectively uses appropriate strategies in a variety of problems;	b) accurately and effectively applies appropriate strategies in problem-solving and new situations;	b) is accurate and fluent when applying mathematical processes; and technologies to solve a variety of problems;	b) is accurate, fluent and articulate when applying mathematical processes and technologies to solve a variety of problems;	b) is accurate, articulate, and effective when applying mathematical processes, and appropriate technologies to solve real and theoretical
c) clearly and	c) presents well-	c) presents well-	c) clearly and	c) effectively	c) effectively uses		problems;
effectively	organized solutions	organized solutions	effectively	defends the	multiple strategies,	c) effectively uses	c) effectively uses
communicates	and communicates in	and communicates in	communicates	correctness of	extends concepts to	multiple strategies,	multiple strategies,
solutions to problems;	ways that exceed	ways that exceed	organized solutions as	solutions to problems	new situations; and	extends concepts to	extends concepts to
	requirements;	requirements;	well as multiple	including presentation	communicates results;	new situations,	new situations,
			approaches to	of multiple		formulates logical	skillfully
			problems;	approaches;		arguments and	communicates the
d) uses whole	d) uses whole	d) uses all four	d) uses all four		d) explores	communicates results;	results;
numbers to add,	numbers accurately	operations on whole	operations on whole	d) applies rational	hypothetical	d) explores	d) explores
subtract, and estimate	and fluently to	numbers, as well as	numbers, decimals,	numbers, proportions,	questions, articulates	hypothetical	hypothetical
accurately and	estimate, compute,	addition and	and fractions	and percents	valid arguments and	questions, articulates	questions, uses
fluently;	and determine	subtraction of	accurately and	accurately and	applies and extends	valid arguments, and	complex reasoning to
	whether results are	decimals, accurately	fluently to estimate,	fluently to solve real	rational numbers and	constructs proofs;	articulate valid
	accurate and	and fluently to	compute, and	and mathematical	proportionality;		arguments, and
	reasonable;	estimate, compute,	determine whether	problems;			constructs proofs;
		and determine whether results are	results are accurate and reasonable;				
		accurate and	and reasonable,				
		reasonable;					
		icasonauic,					

e) writes number					e) consistently		
sentences to represent	e) effectively applies	e) effectively applies	e) effectively uses	e) uses basic	applies algebraic	e) consistently	
simple real addition or	basic algebraic	basic algebraic	basic algebraic	algebraic concepts to	concepts to represent	applies functions,	e) skillfully and
subtraction situations	concepts and clearly	concepts and	concepts and	generate multiple	and solve real and	graphs, and algebraic	accurately applies
and solves the number	communicates	represents	represents	representations of	theoretical problems;	concepts to solve real	functions, graphs, and
sentences;	representations in a	relationships in	relationships in ways	real-world problems	-	and theoretical	algebraic concepts to
	variety of ways;	various ways	appropriate to solving	and uses appropriate		problems;	solve real and
		including	problems;	representations to			theoretical problems;
		expressions/equations,		solve problems;			f) applies complex
f) identifies and		charts, and tables;		_	f) applies complex		measurement and
clearly describes	f) examines	f) examines	f) accurately applies	f) accurately applies	geometric		geometric and
relationships among	relationships of shapes	relationships among	geometric	geometric	relationships to	f) applies complex	algebraic relationships
types of two- and	in the physical world	shapes in the physical	relationships such as	relationships such as	hypothetical	geometric and	to model a variety of
three-dimensional	and makes	world and makes	congruence and	congruence and	situations;	algebraic relationships	problems and
shapes;	generalizations;	generalizations;	symmetry and makes	similarity and makes		to model hypothetical	situations;
			generalizations;	generalizations;		situations;	g) applies complex
g) selects and					g) applies complex		measurement to model
accurately uses	g) selects and	g) selects appropriate	g) accurately	g) predicts from the	measurement to		a variety of problems
appropriate tools for	accurately uses	units for	performs conversions	formulas how a	hypothetical situations	g) applies complex	and situations;
measurement;	appropriate tools for	measurement, relative	between units of area	change in one	and problems;	measurement to model	h) designs statistical
	measurement;	to the purpose of the	and volume;	dimension of a figure		hypothetical situations	experiments and
		measurement,		will change it's area		and problems;	makes accurate and
h) makes accurate		including square and		or volume;	h) consistently makes		reasonable predictions
predictions and	h) accurately predicts	cubic units;	h) makes accurate	h) makes accurate	accurate predictions		and decisions based
inferences based on	and makes reasonable	h) accurately predicts	predictions and	predications and	and decisions based	h) consistently makes	on data, probability,
data; and	decisions based on	and makes reasonable	decisions based on	decisions based on	on basic probability	accurate and	and statistics to solve
	data; and	decisions based on	data, basic probability,	data, basic probability,	and statistics; and	reasonable predictions	real and theoretical
		data, and	and statistics; and	and statistics; and		and decisions based	problems; and
						on data, probability,	i) consistently and
i) analyzes a variety	i) articulately and		1			and statistics; and	accurately analyze
of patterns, accurately	fluently		i) analyzes	i) effectively uses	i) effectively		functions and patterns
identifies next terms	communicates	i) analyzes a wide	mathematical and real	multiple	analyzes and describes	'\ CC 4' 1 1	using graphical,
in the patterns, and	representations,	variety of patterns,	life patterns and	representations	functional	i) effectively and	numerical, and
clearly describes their	analyzes patterns, and	accurately extends the	describes them using	including tables,	relationships and	accurately analyzes	algebraic methods and
rules.	clearly describes	patterns, and clearly	graphical, numerical,	graphs, and algebraic	patterns and their	functions and using	select the appropriate
	relationships, and	describes their rules.	algebraic, and verbal	equations to	representations.	graphical, numerical	function to model real
	applies them to varied situations.		representations.	investigate patterns and functions.		and algebraic	world phenomena.
	situations.			and functions.		methods.	

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10	Upon Graduation
Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	<u>Proficient</u>
a) selects among	a) selects and uses	a) selects and uses	a) selects and uses	a) applies	a) selects and applies	a) applies	a) applies
several problem-	appropriate problem-	appropriate problem-	appropriate strategies	appropriate strategies	mathematical	mathematical	mathematical
solving strategies and	solving strategies and	solving strategies and	and technologies in a	and technologies in a	processes and	processes and	processes and
technologies and	technologies;	technologies;	variety of problems	variety of problems;	technologies correctly	technologies correctly	technologies correctly
applies them					to solve a variety of	to solve a variety of	to solve a variety of
accurately;					problems;	problems and	problems and
						communicates the	communicates the
						results;	results;
					b) formulates and	b) usas rassaning to	h) uses reasoning to
b) communicates	b) communicates	b) communicates	b) communicates	b) communicates	communicates logical	b) uses reasoning to formulate and	b) uses reasoning to formulate and
solutions to problems;	organized solutions to	organized solutions to	organized solutions to	organized solutions to	arguments using	communicate logical	communicate logical
solutions to problems,	problems;	problems;	problems and provides	problems and provides	appropriate	arguments;	arguments and proofs;
	proorems,	problems,	appropriate support;	appropriate support;	mathematical ideas;	argaments,	arguments and proofs,
			Tr Tr Tr Tr Tr Tr Tr	Tr Tr Mark Tr Tr	, , , , , , , , , , , , , , , , , , , ,		
c) uses whole	c) uses all four	c) uses all four	c) uses all four	c) uses rational	c) uses rational	c) uses real and	c) uses real and
numbers to add,	operations of whole	operations of whole	operations of whole	numbers, proportions,	numbers and	complex number	complex number
subtract, multiply, and	numbers to estimate,	numbers, as well as	numbers, decimals,	and percents to solve	proportionality to	systems to solve	systems to solve
make estimates;	compute, and	addition and	and fractions to	problems;	represent and	mathematical	mathematical
	determine whether	subtraction of	estimate and compute,		accurately solve	problems;	problems;
	results are accurate;	decimals, to estimate,	and to determine		problems;		
		compute, and determine whether	whether results are				
		results are accurate	accurate and reasonable;				
		and reasonable;	reasonable,				
		una reasonable,					
d) selects and solves	d) applies basic	d) applies basic	d) uses basic	d) uses basic	d) uses algebraic	d) applies functions,	d) applies functions,
number sentences that	algebra concepts using	algebraic concepts and	algebraic concepts and	algebraic concepts to	concepts and methods	graphs, and algebraic	graphs, and algebraic
represent simple real-	concrete and symbolic	communicates	represents	generate appropriate	to represent and solve	concepts to solve real-	concepts to solve real
world addition or	representations and	different	relationships in	relationships to solve	real-world problems;	world problems;	and theoretical
subtraction situations;	communicates	representations of the	appropriate ways to	real-world problems;			problems;
	relationships in a	same relationship;	solve selected				
	variety of ways;		problems;				

e) identifies two- and three-dimensional shapes	e) identifies and accurately uses relationships among shapes in the physical world;	e) identifies and accurately uses relationships among shapes in the physical world;	e) applies geometric relationships to solve selected problems;	e) applies geometric relationships such as coordinates and transformations to solve selected problems;	e) uses geometric relationships and properties to solve real-world problems;	e) applies geometric relationships properties to model a variety of problems and situations;	e) applies geometric and algebraic relationships to model a variety of problems and situations;
f) determines measurable attributes of objects and selects appropriate tools for measurement;	f) determines measurable attributes of objects and selects appropriate tools for measurement;	f) selects appropriate units for measurements, including square and cubic units;	f) performs conversions among basic units within a system of measurement and determines the areas of geometric figures;	f) uses formulas to determine areas and volumes;	f) uses complex measurement to describe the physical world and solve real- world problems;	f) applies complex measurement to describe and compare and contrast objects in the physical world and solve real-world problems;	f) applies complex measurement and appropriately analyzes error of measurement, precision, and accuracy;
g) draws appropriate conclusions based on data; and	g) predicts and makes appropriate decisions based on data; and	g) predicts and makes appropriate decisions based on data; and	g) makes reasonable predictions and decisions based on data, basic probability, and statistics; and	g) makes reasonable predictions and decisions based on data, probability, and statistics; and	g) makes reasonable predictions and decisions based on data, basic probability, and statistics; and	g) makes reasonable predictions and decisions based on data, probability, and statistics: and	g) designs simple statistical experiments selecting appropriate samples and makes reasonable predictions and decisions based on data, probability, and statistics: and
h) identifies a variety of patterns and the next term in the patterns.	h) uses a variety of patterns to describe real-world relationships.	h) analyzes a variety of patterns, and represents their relationships in various ways.	h) analyzes a variety of patterns, and represents their relationships in various ways.	h) analyzes and describes patterns and functions using various representations.	h) analyzes and describes functional relationships and their representations.	h)analyze functions using graphical, numerical, and algebraic methods.	h) analyzes functions using graphical, numerical, and algebraic methods and select the appropriate function to model real world phenomena.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	<u>Grade 10</u>	Upon Graduation
Nearing Proficiency	Nearing Proficiency	Nearing Proficiency	Nearing Proficiency	Nearing Proficiency	Nearing Proficiency	Nearing Proficiency	Nearing Proficiency
a) sometimes uses	a) sometimes selects	a) sometimes selects	a) sometimes selects	a) sometimes applies	a) applies	a) applies	a) applies
appropriate problem-	and uses appropriate	and uses appropriate	and uses appropriate	appropriate strategies	mathematical	mathematical	mathematical
solving strategies and	problem-solving	problem-solving	strategies and	and technologies to	processes and	processes and	processes and
technologies;	strategies and	strategies and	technologies to solve	solve problems;	technologies correctly	technologies correctly	technologies correctly
	technologies;	technologies;	problems		to solve problems;	to solve problems and	to solve problems and
						sometimes	sometimes
						communicates the	communicates the
						results;	results;
	b) sometimes	b) sometimes	b) sometimes	b) sometimes	b) formulates and	b) uses reasoning to	b) uses reasoning to
	communicates	communicates	communicates	communicates	communicates	formulate arguments	formulate arguments
solutions to problems;	organized solutions to	organized solutions to	organized solutions to	organized solutions to	arguments	and with assistance	and with assistance
	problems;	problems;	problems with limited	problems with limited	occasionally using	solves simple proofs;	solves simple proofs;
			support;	support;	appropriate		
					mathematical ideas;		
,	c) uses all four	c) uses all four	c) uses all four	c) uses rational	c) uses rational	c) uses real and	c) uses real and
	operations with whole	operations with whole	operations of whole	numbers, proportions,	numbers and	complex number	complex number
, 1	numbers to estimate	numbers, as well as	numbers, decimals,	and percents to solve	proportionality to	systems to solve	systems to solve
	and compute with	addition and	and fractions to	problems, with	represent and solve	mathematical	mathematical
•	generally reasonable	subtraction of	estimate and compute,	occasional errors;	problems, with	problems with	problems with
results;	results;	decimals, to estimate	with occasional errors,		occasional errors;	occasional errors;	occasional errors;
		and compute with	particularly with				
		generally reasonable	decimals and	d) sometimes uses			
d) sometimes	d) sometimes applies	results; d) sometimes applies	fractions; d) sometimes uses	d) sometimes uses basic algebraic	d) sometimes uses	d) comotimos annlias	d) sometimes applies
recognizes and solves	basic algebraic	basic algebraic	basic algebraic		algebraic relationships	d) sometimes applies functions, graphs, and	·
	concepts using	concepts and	concepts and	concepts to generate appropriate	to solve real-world	algebraic concepts to	functions, graphs, and algebraic concepts to
	concrete and symbolic	communicates	represents	relationships to solve	problems;	solve real-world and	solve real-world and
world addition or	representations and	different	relationships to solve	real-world problems;	problems,	theoretical problems;	theoretical problems;
subtraction situations;	communicates	representations of the	simple problems;	e) sometimes applies		incorcical problems,	theoretical problems,
,	relationships;	same relationship;	simple problems,	geometric geometric	e) sometimes uses	e) sometimes applies	e) sometimes applies
	e) sometimes	e) sometimes	e) sometimes applies	relationships, such as	geometric	geometric and	geometric and
′	identifies and uses	identifies and uses	geometric	coordinates and	relationships to solve	algebraic relationships	algebraic relationships
shapes, but with	relationships among	basic relationships	relationships to solve	transformations, to	real-world problems;	to model a variety of	to model a variety of
	shapes in the physical	among shapes in the	simple problems;	solve simple	p. 00101115,	problems and	problems and
	world;	physical world;	r r,	problems;		situations;	situations;
	,	1 2		,		, , , , , , , , , , , , , , , , , , ,	, , , , , , , , , , , , , , , , , , ,

f) determines	f) determines	f) sometimes selects	f) performs	f) uses formulas to	f) uses measurement	f) sometimes applies	f) sometimes applies
measurable attributes	measurable attributes	appropriate units for	conversions among	determine areas and	to describe the	complex measurement	complex measurement
of objects, but does	of objects, but does	measurement	basic units within a	volumes with	physical world and	and analyzes error of	and analyzes error of
not always select	not always select	including square and	system of	occasional errors;	solve real-world	measurement,	measurement,
appropriate tools for	appropriate tools for	cubic units;	measurement and		problems, with	precision, and	precision, and
measurement;	measurement;		sometimes determines		occasional errors;	accuracy;	accuracy;
			the areas of geometric				
			figures, with				
			occasional errors;				
g) reads data from	g) sometimes	g) sometimes	g) sometimes makes	g) makes reasonable		g) sometimes makes	g) designs simple
simple graphs and	predicts and makes	predicts and makes	reasonable predictions	predictions and	g) makes reasonable	predictions and	statistical experiments
charts and sometimes	appropriate decisions	appropriate decisions	and decisions based	decisions based on	predictions and	decisions based on	selecting appropriate
draws appropriate	based on data; and	based on data; and	on data, basic	data, probability, and	decisions based on	data, probability, and	samples and makes
conclusions; and			probability, and	statistics with	data, probability, and	statistics, with	predictions and
			statistics; and	occasional errors; and	statistics, with	occasional errors; and	decisions based on
					occasional errors; and		data, probability, and statistics, with
							occasional errors; and
h) identifies simple	h) uses a limited	h) analyzes a limited		h) analyzes and		h) analyzes and	h) analyzes patterns
patterns and	range of patterns, and	variety of patterns and	h) analyzes a limited	describes patterns and	h) analyzes and	describes simple	and functions using
sometimes identifies	sometimes describes	represents their	variety of patterns and	functions using	describes simple	patterns and	graphical, numerical,
the next term.	relationships within	relationships.	represents their	limited	patterns and	functional	and algebraic methods
	those patterns.		relationships.	representations.	functional	relationships, using	and sometimes selects
					relationships using	limited graphical,	the appropriate
					limited	numerical, and	function to model
					representations.	algebraic methods.	real-world
							phenomena.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10	Upon Graduation
<u>Novice</u>	Novice	<u>Novice</u>	<u>Novice</u>	<u>Novice</u>	<u>Novice</u>	Novice	<u>Novice</u>
a) uses only a few	a) sometimes selects	a) sometimes selects	a) demonstrates use	a) frequently applies	a) selects and applies	a) demonstrates	a) demonstrates
problem-solving	and uses only a few	and uses only a few	of only a few	incomplete or	only a few	limited and	limited and
strategies and	problem-solving	problem-solving	problem-solving	incorrect strategies	mathematical	incomplete use of	incomplete use of
technologies	strategies and	strategies and	strategies and	and technologies for	processes and	mathematical	mathematical
correctly;	technologies;	technologies;	technologies, often	problem solving;	technologies problem	processes and	processes and
			implementing them		solving;	problem-solving	problem-solving
			incompletely or			strategies;	strategies;
	b) communicates	b) communicates	incorrectly;	b) often	b) often formulates		
b) often	poorly organized	poorly organized	b) often	communicates	and communicates	b) often uses limited	b) often uses limited
communicates only	solutions;	solutions;	communicates	incomplete or	incomplete arguments	and incomplete	and incomplete
limited information			incomplete or	confused descriptions	using appropriate	reasoning to formulate	reasoning to formulate
regarding solutions to			confused descriptions	of solutions;	mathematical ideas;	arguments and	logical arguments and
problems;			of solutions;			communicate	communicate
	c) uses all four	c) uses all four		c) uses rational	c) uses rational	mathematical ideas;	mathematical ideas;
c) uses whole	operations with whole	operations with whole	c) uses all four	numbers, proportions,	numbers and	c) makes only	c) makes only
numbers to add,	numbers to estimate	numbers, as well as	operations with whole	and percents, with	proportionality to	concrete,	concrete,
subtract, multiply and	and compute, but is	addition and	numbers, decimals,	frequent errors;	represent and solve	mathematical	mathematical
make estimates, but is	frequently inaccurate;	subtraction of	and fractions to		problems, often with	connections;	connections;
frequently inaccurate;		decimals, to estimate	estimate and compute		errors;		
		and compute but is	with frequent errors				
		frequently inaccurate;	particularly with	d) sometimes uses			
			decimals and	basic algebraic			
	d) demonstrates	d) demonstrates	fractions;	concepts to represent	d) sometimes uses		
d) solves some	some algebraic	some understanding of	d) uses basic	simple real-world	basic algebraic	d) sometimes applies	d) sometimes applies
simple number	understanding of	basic algebraic	algebraic concepts to	problems, but has	concepts, methods,	algebraic concepts and	algebraic concepts and
sentences, but has	concrete and symbolic	concepts, but often	represent simple	difficulty using	and simple	methods, functions,	methods functions,
difficulty associating	representations, but	has difficulty	problems, but often	representations to	representations to	and graphs to solve	graphs, and to solve
number sentences	often misconceptions	explaining or	with conceptual	solve problems;	solve simple real-	real-world problems;	real-world problems;
with real situations;	are present;	generalizing;	errors;	e) applies geometric	world problem;		
-) :14:6: 6 4	e) identifies, models,	-> :14:6:		relationships, such as	e) applies geometric	-)1:	-)1:
e) identifies few two-	and classifies some	e) identifies some	-) :14:4:	coordinates and	relationships and	e) applies geometric	e) applies geometric
and three-dimensional	shapes with limited	basic relationships	e) identifies simple	transformations, often	properties, often	relationships and	relationships and
shapes;	understanding of their	among shapes in the	examples of geometric	incorrectly, when	incorrectly, to solve	properties, often	properties, often
	relationships;	physical world;	relationships such as	attempting to solve	simple real-world	incorrectly, to solve	incorrectly, to solve
			congruence and	simple problems;	problems;	simple real-world	real-world problems;
			symmetry;			problems;	

	f) determines some			f) uses formulas to	f) uses basic		
f) determines some	measurable attributes	f) determines the		determine areas and	measurement to	f) uses basic	f) uses basic
measurable attributes	of objects, but often	type of measurement	f) performs only	volumes with frequent	describe the physical	measurement to	measurement to
of objects, but often	does not select	required but often	simple conversions	errors;	world and solve	describe the physical	describe the physical
does not select	appropriate tools for	does not select the	among basic units		simple real-world	world and solve	world and solve
appropriate tools for	measurement;	appropriate units;	within a system of		problems, often with	simple real-world	simple real-world
those measurements;			measurement, and		errors;	problems, often with	problems;
			often incorrectly			errors;	
	g) sometimes		determines the areas	g) makes simple	g) makes some		
g) reads data from	predicts, but often	g) often makes	of geometric figures;	predictions and	predictions and	g) makes some	g) makes some
simple graphs or	makes inappropriate	incorrect predictions	g) often makes	decisions based on	decisions based on	predictions and	predictions and
charts, often	decisions based on	and decisions based	inaccurate predictions	data, basic probability,	data, basic probability,	decisions based on	decisions based on
incorrectly; and	data; and	on data; and	and decisions based	and statistics, often	and statistics, often	data, but seldom	data, but seldom
			on data, basic	with errors; and	with errors; and	recognizes statistical	recognizes statistical
			probability, and			or probability	or probability
			statistics; and			concepts; and	concepts; and
	h) uses a limited			h) analyzes simple	h) analyzes simple		
h) sometimes	range of patterns and	h) analyzes some		patterns and functions	patterns and functions	h) analyzes and	h) analyzes and
identifies the next	inaccurately describes	simple patterns and		and describes their	and describes their	describes patterns and	describes patterns and
term in simple	relationships within	sometimes represents	h) analyzes simple	relationships, often	relationships, often	functional	functional
patterns, often	those patterns.	their relationships	patterns and	with errors.	with errors.	relationships and their	relationships and their
inaccurately.			represents their			representations, often	representations, often
			relationships, often			with errors.	with errors.
			with errors.				